

Service life prediction

- Critical Issues

- Current methods rely on outdoor exposure to determine service life. In the modern multi-component formulations, such as automotive coatings, the complex interactions are not explored until costly failures have occurred. This leads to long product development times and large liability exposures for new or modified formulations.

- Research Strategy

- Develop rapid high throughput screening tools using a reliability-based cumulative damage model to assess how the complex interactions between components will affect in-service performance of new materials. This involves generating high flux controlled temperature, humidity, UV wavelength and dose exposures for coating samples as well as monitored outdoor exposures.

- Research Highlights

- Current research efforts have focused on industrial based formulations such as automotive or aircraft coatings, composites and sealant. We have developed a very high flux integrating sphere that can deliver 1-65 “suns” of uniform UV radiation simultaneously to 32 individually controlled temperature, humidity, and UV exposure chambers. Each of these chambers have been designed to accommodate a wide variety of samples requirements ranging from simulated deep space to cyclic mechanical stressing. To analyze the vast richness of data generated by the exposure device several fully automated spectrometers have been interfaced to an advanced sample positioning table. These unique capabilities allow us to spectroscopically map over 30 samples/day. Each sample will contain a entire library of information about the interaction of two process or composition variables exposed to a specific environmental condition. This system will allow for rapid service life prediction and the compression of product development time.



For more information ...

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